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Framework Convention on Climate Change

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# Report of the technical review of the sixth national communication of Liechtenstein

Parties included in Annex I to the Convention are requested, in accordance with decision 9/CP.16, to submit a sixth national communication to the secretariat by 1 January 2014. In accordance with decision 7/CMP.8, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their sixth national communication supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

This report presents the results of the technical review of the sixth national communication and supplementary information under the Kyoto Protocol of Liechtenstein conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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# I. Introduction and summary

## A. Introduction

1. For Liechtenstein, the Convention entered into force on 20 September 1994 and the Kyoto Protocol on 16 February 2005. Under the Convention, Liechtenstein made a commitment to reducing its greenhouse gas (GHG) emissions by 20 per cent by 2020 below the 1990 level. It offered to increase this target to 30 per cent conditional on other developed countries committing to a comparable target and more advanced developing countries taking appropriate mitigation actions. Under the Kyoto Protocol, Liechtenstein committed itself to reducing its GHG emissions by 8 per cent compared with the base year[1] level during the first commitment period, from 2008 to 2012. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Liechtenstein committed to reduce its GHG emissions by 20 per cent below the 1990 level.

2. This report covers the centralized technical review of the sixth national communication (NC6) of Liechtenstein, coordinated by the secretariat, in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" (decision 23/CP.19) and the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1).

3. The review took place from 5 to 10 May 2014 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Eglantina Bruci (Albania), Mr. Øyvind Christophersen (Norway), Mr. Sorin Deaconu (Romania), Ms. Agnieszka Janowska (Poland), Mr. Robert Jeszke (Poland), Mr. Bundit Limmeechokchai (Thailand), Ms. Jenny Mager (Chile), Mr. Erick Masafu (Kenya), Mr. Alexander Storch (Austria), Mr. Daniel Tutu Benefoh (Ghana), Mr. Goran Vukmir (Bosnia and Herzegovina) and Mr. Pavel Zámyslický (Czech Republic). Ms. Janowska and Mr. Tutu Benefoh were the lead reviewers. The review was coordinated by Ms. Barbara Muik and Mr. Matthew Dudley (secretariat).

4. During the review, the expert review team (ERT) reviewed each section of the NC6. The ERT also reviewed the supplementary information provided by Liechtenstein as a part of the NC6 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Liechtenstein in its 2013 annual submission and previous submissions under Article 7, paragraph 1, of the Kyoto Protocol.

5. In accordance with decisions 23/CP.19 and 22/CMP.1, a draft version of this report was communicated to the Government of Liechtenstein, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

[1] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide, methane and nitrous oxide, and 1995 for perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

## B. Summary

6. The ERT conducted a technical review of the information reported in the NC6 of Liechtenstein in accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines on NCs). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol[2] is provided in the NC6 (see, in particular, paras. 99 and 100 below). The supplementary information on the minimization of adverse impacts referred to in paragraph 4 above is complete and transparent.

7. Liechtenstein considered part of the recommendations provided in the report of the in-depth review of the fifth national communication (NC5) of Liechtenstein.[3] The ERT commended Liechtenstein for its improved reporting. During the review, Liechtenstein provided further relevant information, including further information on policies and measures (PaMs) (chapter II.B) and projections (chapter II.C).

### 1. Completeness and transparency of reporting

8. Gaps and issues related to the reported information identified by the ERT are presented in table 1 below.

### 2. Timeliness

9. The NC6 was submitted on 23 December 2013, before the deadline of 1 January 2014 mandated by decision 9/CP.16.

### 3. Adherence to the reporting guidelines

10. The information reported by Liechtenstein in its NC6 is partially in adherence with the UNFCCC reporting guidelines on NCs as per decision 4/CP.5 (see table 1).

[2] Decision 15/CMP.1, annex, chapter II.
[3] FCCC/IDR.5/LIE.

Table 1

**Assessment of completeness and transparency issues of reported information in the sixth national communication of Liechtenstein**[a]

| *Sections of national communication* | *Completeness* | *Transparency* | *Reference to paragraphs* | *Supplementary information under the Kyoto Protocol* | *Completeness* | *Transparency* | *Reference to paragraphs* |
|---|---|---|---|---|---|---|---|
| Executive summary | Complete | Transparent | | National systems | Complete | Transparent | |
| National circumstances | Complete | Transparent | | National registries | Complete | Transparent | |
| Greenhouse gas inventory | Complete | Transparent | | Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 | Complete | Mostly transparent | 78 |
| Policies and measures (PaMs) | Partially complete | Partially transparent | 27 | PaMs in accordance with Article 2 | Partially complete | Partially transparent | 57 |
| Projections and total effect of PaMs | Mostly complete | Mostly transparent | 72 | Domestic and regional programmes and/or arrangements and procedures | Mostly complete | Mostly transparent | 20, 21, 25 |
| Vulnerability assessment, climate change impacts and adaptation measures | Partially complete | Partially transparent | 89 | Information under Article 10[b] | NA | NA | |
| Financial resources and transfer of technology[c] | NA | NA | | Financial resources[c] | NA | NA | |
| Research and systematic observation | Mostly complete | Transparent | 94 | Minimization of adverse impacts in accordance with Article 3, paragraph 14 | Partially complete | Transparent | 102 |
| Education, training and public awareness | Complete | Transparent | | | | | |

*Abbreviation*: NA = not applicable

[a] A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in the chapter on conclusions and recommendations.

[b] For the purposes of reporting information in this table, this assessment refers to information provided by the Party on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant for developed country Parties and other developed Parties included in Annex II to the Convention only. Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

[c] Reporting on financial resources under the Kyoto Protocol is relevant for developed country Parties and other developed Parties that are included in Annex II to the Convention (Annex II Parties). As Liechtenstein is not an Annex II Party, it does not have an obligation to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

# II. Technical review of the reported information in the national communication and supplementary information under the Kyoto Protocol

## A. Information on greenhouse gas emissions and national circumstances relevant to greenhouse gas emissions and removals, including other elements related to the Kyoto Protocol

### 1. Information on relevant national circumstances

11. In its NC6, Liechtenstein has provided a detailed description of the national circumstances and elaborated on the framework legislation and key policy documents on climate change. Further information on the review of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B below.

12. The NC6 includes all information required by the UNFCCC reporting guidelines on NCs on government structure, population profile, geographic profile, climate profile, economic profile, energy, transportation, industry, waste, building stock and urban infrastructure, agriculture and forestry. However, the information provided by Liechtenstein on how arrangements and administrative procedures ensure implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol contribute to the conservation of biodiversity and the sustainable use of resources was not sufficiently transparent.

13. Table 2 illustrates the national circumstances of Liechtenstein by providing some indicators relevant to GHG emissions and removals.

Table 2
**Indicators relevant to greenhouse gas emissions and removals for Liechtenstein**

| | *1990* | *2000* | *2005* | *2010* | *2011* | *Change 1990–2011 (%)* | *Change 2010–2011 (%)* |
|---|---|---|---|---|---|---|---|
| Population (thousand) | 29.03 | 32.86 | 34.90 | 36.14 | 36.47 | 25.6 | 0.9 |
| GDP (2005 USD billion using PPP) | NA | NA | NA | NA | NA | NA | NA |
| TPES (Mtoe) | NA | NA | NA | NA | NA | NA | NA |
| GHG emissions without LULUCF (kt $CO_2$ eq) | 230.33 | 254.90 | 234.12 | 234.12 | 222.04 | –3.6 | –5.2 |
| GHG emissions with LULUCF (kt $CO_2$ eq) | 220.87 | 246.31 | 226.98 | 226.98 | 215.02 | –2.6 | –5.3 |
| GDP per capita (2005 USD thousand using PPP) | NA | NA | NA | NA | NA | NA | NA |
| TPES per capita (toe) | NA | NA | NA | NA | NA | NA | NA |
| GHG emissions per capita (t $CO_2$ eq) | 7.93 | 7.76 | 6.71 | 6.48 | 6.09 | –23.2 | –6.0 |
| GHG emissions per GDP unit (kg $CO_2$ eq per 2005 USD using PPP) | NA | NA | NA | NA | NA | NA | NA |

*Sources*: (1) GHG emission data: Liechtenstein's 2013 GHG inventory submission, version 1.1; (2) Population, GDP and TPES data: Not applicable.

*Note*: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

*Abbreviations*: GDP = gross domestic product, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not available, PPP = purchasing power parity, TPES = total primary energy supply.

## 2. Information on the greenhouse gas inventory, emissions and trends

14. Liechtenstein has provided a summary of information on GHG emission trends for the period 1990–2011. This information is fully consistent with the 2013 national GHG inventory submission. Summary tables, including trend tables for emissions in carbon dioxide equivalent ($CO_2$ eq) (given in the common tabular format tables), are provided in an annex to the NC6. During the review, the ERT took note of the recently submitted 2014 annual submission. The relevant information therein is reflected in this report.

15. Total GHG emissions[4] excluding emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 3.6 per cent between 1990 and 2011, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 2.7 per cent over the same period. This decrease in total GHG emissions was mainly attributable to $CO_2$ emissions, which decreased by 9.0 per cent over this period. Trends in the country's total GHG emissions were mostly underpinned by GHG emission trends in the energy sector, which were driven by fuel consumption, especially in the transport, residential, commercial and institutional subsectors. In addition to the increase of emissions in 2006 and 2008, caused by fuel price fluctuations that resulted in changing stocking behaviour for fuel tanks, a continuous negative trend in $CO_2$ emissions can be observed since 2008. Emissions from methane ($CH_4$) and nitrous oxide ($N_2O$) increased by 7.2 and 1.2 per cent, respectively, over the same period. The key drivers for the rise in $CH_4$ emissions are an increase in population leading to higher emissions from wastewater treatment and an increase in composting activities, which more than offset the decrease in emissions from the category solid waste disposal on land. The share of fluorinated gases (F-gases) in Liechtenstein's total GHG emissions was negligible in the base year and was 39.0 per cent of the total GHG emissions in 2011. The key driver for the rise in F-gas emissions in the industrial processes sector is the increasing use of hydrofluorocarbons (HFCs) in refrigeration and air-conditioning equipment. An analysis of the drivers of GHG emission trends in each sector is provided in chapter II.B below. Table 3 provides an overview of GHG emissions by sector from 1990 to 2011.

Table 3
**Greenhouse gas emissions by sector in Liechtenstein, 1990–2011**

| | *GHG emissions (kt $CO_2$ eq)* | | | | *Change (%)* | | *Share[a] by sector (%)* | |
|---|---|---|---|---|---|---|---|---|
| *Sector* | *1990* | *2000* | *2010* | *2011* | *1990–2011* | *2010–2011* | *1990* | *2011* |
| 1. Energy | 203.78 | 229.46 | 201.89 | 187.08 | –8.2 | –7.3 | 88.5 | 84.3 |
| A1. Energy industries | 0.18 | 2.72 | 3.20 | 3.00 | 1 613.4 | –6.2 | 0.1 | 1.4 |
| A2. Manufacturing industries and construction | 35.33 | 34.34 | 22.39 | 19.36 | –36.6 | –13.5 | 15.3 | 8.7 |

[4] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of $CO_2$ eq excluding land use, land-use change and forestry, unless otherwise specified.

| Sector | GHG emissions (kt $CO_2$ eq) | | | | Change (%) | | Share[a] by sector (%) | |
|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2011 | 1990–2011 | 2010–2011 | 1990 | 2011 |
| A3. Transport | 76.69 | 95.84 | 80.47 | 79.53 | 3.7 | –1.2 | 33.3 | 35.8 |
| A4, A5. Other | 91.27 | 95.84 | 94.78 | 84.16 | –7.8 | –11.2 | 39.6 | 37.9 |
| B. Fugitive emissions | 0.32 | 0.73 | 1.05 | 1.03 | 223.1 | –1.9 | 0.1 | 0.5 |
| 2. Industrial processes | 0.00 | 2.41 | 6.75 | 8.81 | 9 286 | 30.6 | 0.0 | 4.0 |
| 3. Solvent and other product use | 2.02 | 1.24 | 0.99 | 0.99 | –50.7 | 0.9 | 0.9 | 0.4 |
| 4. Agriculture | 22.96 | 20.07 | 22.73 | 23.37 | 1.8 | 2.8 | 10.0 | 10.5 |
| 5. LULUCF | –9.46 | –8.59 | –7.14 | –7.03 | –25.7 | –1.6 | –4.1 | –3.2 |
| 6. Waste | 1.58 | 1.72 | 1.77 | 1.78 | 13.2 | 0.8 | 0.7 | 0.8 |
| **GHG total with LULUCF** | **220.87** | **246.31** | **226.98** | **215.02** | **–2.7** | **–5.3** | **NA** | **NA** |
| **GHG total without LULUCF** | **230.33** | **254.90** | **234.12** | **222.04** | **–3.6** | **–5.2** | **100.0** | **100.0** |

*Note:* The changes in emissions and the share by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.

*Abbreviations:* GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA= not applicable.

[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

## 3. National system

16. Liechtenstein provided in its NC6 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes all the elements as mandated by decision 15/CMP.1. The NC6 also contains a reference to the description of a national system provided in the report mandated by decision 13/CMP.1, submitted in 2006,[5] and the national inventory report (NIR) of the 2013 annual submission. The ERT took note of the review of the changes to the national system as reflected in the report of the individual review of the GHG inventory of Liechtenstein submitted in 2013.

## 4. National registry

17. In its NC6, Liechtenstein has provided information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT took note of the review of the changes to the national registry as reflected in the report of the individual review of the GHG inventory of Liechtenstein submitted in 2013.

18. Liechtenstein described the changes, specifically due to the centralization of the European Union Emissions Trading System (EU ETS) operations into a single European Union (EU) registry operated by the European Commission, called the Consolidated System of European Union registries (CSEUR). The CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

[5] Party's initial report under the Kyoto Protocol. The report to facilitate the calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, available at <http://unfccc.int/national_reports/initial_reports_under_the_kyoto_protocol/items/3765.php>.

### 5. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

19. Liechtenstein has reported in its NC6 mostly comprehensive and well-organized information on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol.

20. The NC6 does not include information on procedures for addressing cases of non-compliance under domestic law required by the UNFCCC reporting guidelines on NCs on domestic and regional programmes, legislative arrangements, and enforcement and administrative procedures on the reporting of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. During the review, Liechtenstein provided additional information including information on cases of non-compliance under domestic law. It was explained that in terms of breach of data delivery obligation (i.e. in order to prepare the NIR) "the Office of Environmental Protection may sanction the responsible persons up to 30,000 Swiss Francs in accordance with Art. 89 para 1 and Art. 73 Environmental Protection Act".[6] The ERT recommends that Liechtenstein include this information in its next national communication (NC).

21. The NC also does not include information on: relevant legislative arrangements, and enforcement and administrative procedures for all PaMs reported; provisions to make information on these legislative arrangements; and if enforcement and administrative procedures are publicly accessible. The inclusion of this information in the NC would enhance the transparency of information regarding legislative arrangements, and thereby the ERT recommends that Liechtenstein include this information in its next NC.

22. The overall responsibility for climate change policymaking lies within the Ministry of Environment and the Office of Environment of Liechtenstein; a number of national institutions are involved in the implementation of this policy.

23. The implementation of the Kyoto Protocol is underpinned by the Climate Protection Strategy, which requires coordination in the following sectors: energy, building, transportation, agriculture and forestry. The major framework policies are the Emissions Trading Act and the $CO_2$ Act. The Emissions Trading Act establishes the legal obligation for the government to reduce by 20 per cent the total GHG emissions compared with the 1990 level by 2020 and implements the EU emissions trading directive (directive 2003/87/EC).

24. Liechtenstein has coordinated its climate-related PaMs into a sectoral approach. This means that the respective sectoral administration offices are in charge of the implementation, execution and monitoring of the effects of the individual PaMs. These entities report their activities to Liechtenstein's Parliament annually, with this report being made publicly available.

25. Liechtenstein did not provide a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. During the review, Liechtenstein explained that under the application of the International Humanitarian Cooperation and Development (IHCD) Law, the Office for Foreign Affairs developed a concrete strategy for supporting projects that contribute to combat climate warming, the pollution of the seas and the loss of biodiversity. In this context, there is a specific focus in the development of mountainous regions. The regional

[6] Available at <https://www.gesetze.li/get_pdf.jsp?PDF=2008199.pdf>.

focus of projects has traditionally been in the South Caucasus. The ERT recommends that Liechtenstein include this information in its next NC.

## B. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

26. Liechtenstein has provided in its NC6 comprehensive and well-organized information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol.

### 1. Policies and measures related to implementation of commitments under the Convention

27. In its NC6, Liechtenstein reported on its PaMs adopted, implemented and planned in achieving its commitments under the Convention. Liechtenstein provided information on PaMs by sector and by gas and included a description of the principal PaMs. Liechtenstein has not provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention, although several PaMs have the explicit goal of modifying those long-term trends. The NC6 contains, with a few exceptions, a set of PaMs similar to those in the NC5. The NC6 does not include information required by the UNFCCC reporting guidelines on NCs on the implementation status or implementing entities for all principal PaMs. Furthermore, the information regarding the type of policy or measure is presented using a different terminology to that suggested in the guidelines. The ERT recommends that Liechtenstein include the following information in its next NC in order to improve its completeness: details on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals, consistent with the objective of the Convention; the implementation status and implementing entities for all principal PaMs; and the type(s) of PaMs using the terms provided in the UNFCCC reporting guidelines on NCs, or explain why this was not possible.

28. Liechtenstein provides updated information on the policies contained in the NC5. The NC6 details efforts to reduce GHG emissions at national and international levels. In this regard, Liechtenstein points out the role of cross-border cooperation, especially with Switzerland, meaning that most policy areas are closely linked to Swiss policy. In addition, Liechtenstein reports the overall national arrangements implemented in order to monitor PaMs, explaining that the tracking of each policy or measure is done by the respective administration office.

29. The NC6 does not include some information required by the UNFCCC reporting guidelines on NCs on the estimation of the effect or impact of individual PaMs, and it is not clear how the progress of the policies or measures is evaluated over time. In addition, insufficient information is reported regarding the benefits of the PaMs, and an incomplete description of activities and/or source and sink categories affected is provided. The ERT strongly encourages Liechtenstein to report the estimates of mitigation impacts of its reported PaMs, as well as an explanation of how it assesses progress made, and more information about the costs of PaMs and interaction between policies, in its next NC.

30. During the review, Liechtenstein provided additional information, elaborating on the administrative and legislative arrangements of climate-related policies ($CO_2$ Act and Emissions Trading Act) and how the information gathered in the monitoring of those policies is being used to assess the results achieved. Furthermore, Liechtenstein provided clarification on the target of the $CO_2$ Act, explaining that the intermediate targets for relevant sectors are the same as those that Switzerland has in place. Regarding PaMs that

have been maintained over time. Liechtenstein explained that the effects observed have been monitored through the analysis of the sectoral data within the GHG inventory. Comprehensive information with regard to monitoring of the Energy Strategy 2020 was also provided through the official strategy document. The ERT encourages Liechtenstein to provide, in its next NC, an explanation of how it assesses progress made, and more information about the costs of PaMs and interaction between policies.

31. Some of the recommendations made in the previous review report were taken into consideration in order to improve reporting in the NC6, including the improvement in the provision of some information on the monitoring of the progress of PaMs.

## 2. Policy framework and cross-sectoral measures

32. The legal basis for climate change policy has been established in the Climate Protection Strategy, which coordinates the effort to incorporate climate-related measures in different sectoral legislation. This approach requires 'nterdisciplinary coordination in the fields of the environment, energy, buildings, transportation, agriculture and forestry with respect to the development of climate policy measures. The Ministry of Environment and the Office of Environment are in charge of the coordination of this strategy, which is to be revised during 2014.

33. The relations between Liechtenstein and the EU are close, and cooperation is intensive. Since 1 May 1995, Liechtenstein has been linked with the EU and its member States through an extensive association agreement: the Agreement on the European Economic Area. This agreement extends the Single Market of the EU by three of the four European Free Trade Association States, namely Liechtenstein, Iceland and Norway. On this basis, Liechtenstein implements EU legislation related to the Single Market, as well as to other areas such as environment and climate change.

34. There are two laws that substantially influence climate and energy policy in Liechtenstein, namely the Emissions Trading Act and the $CO_2$ Act. The Emissions Trading Act implemented in 2008 (deriving from EU legislation, directive 2003/87/EC) established a concrete reduction target of at least 20 per cent compared with 1990 levels by 2020, and obliges the two industrial combustion installations operating in Liechtenstein to participate in the EU ETS. The $CO_2$ Act (also implemented in 2008) foresees a reduction in emissions from energy-related use of fossil fuel up to 2020, especially in the building (construction) and industrial sectors. Importantly, this act introduced a $CO_2$ levy on oil, gas and coal, and is very similar to the equivalent act in Switzerland as it is an integral part of the bilateral agreement between both countries. Because of a revision of the Swiss act in 2011/2012, the Liechtenstein $CO_2$ Act was adjusted to widen its scope and adjust the incentive framework. This means: an increase of the $CO_2$ levy from EUR 10/t $CO_2$ (in 2008) to EUR 30/t $CO_2$ in 2010, and to EUR 50/t $CO_2$ in 2014; an increased financial allocation towards environmental measures; and the establishment of $CO_2$ emissions regulation for passenger cars and of a compensation obligation for importers of motor fuels.

35. The NC6 provides information about the environmental policy framework where the 2008 Environmental Protection Act is explained as a summarized set of regulatory measures that streamline procedures within environmental law. According to information provided during the review, the act forms the legal basis for the Air Quality Ordinance that, in the period 2007–2013, led to the elimination of around 2,000 oil/gas combustion installations, corresponding to an estimated emission reduction of 1 kt $CO_2$ eq/year.

36. Because of the small size of the country's territory, Liechtenstein does not possess widely developed regional institutions, and climate action is mainly under the responsibility of the very centralized government with some support from municipalities. Therefore, Liechtenstein reported some information on the role of municipalities in funding energy

conservation subsidies as an example of PaMs at a regional level. The ERT encourages Liechtenstein to include information on PaMs at a regional level in its next NC.

37. Table 4 provides a summary of the reported information on the PaMs of Liechtenstein.

Table 4
**Summary of information on policies and measures reported by Liechtenstein**

| *Sectors affected* | *List of key policies and measures* | *Estimate of mitigation impact (kt $CO_2$ eq)* |
|---|---|---|
| ***Policy framework and cross-sectoral measures*** | Planned National Climate Strategy (2014) | NE |
| | Environmental Protection Act that provides the legal basis for emission limits for commercial and household, waste diversion measures, and establishes the Action Plan for Air | NE |
| | Environmental policy that includes environmental levies | NE |
| | Emissions regulations with regard to emission limits | NE |
| | Emissions Trading Act that governs involvement of two industrial facilities in the European Union Emissions Trading System | NE |
| ***Energy*** | $CO_2$ Act that introduces levies to drive efficiencies in the consumption of energy | NE |
| Energy supply | | |
| | Energy Strategy 2020 that promotes efficient use of energy and renewable energy | 6.89 |
| Renewable energy | | |
| | Ordinance on the Liberalization of the Electricity Market including green electricity, hydropower and geothermal measures | NE |
| | Steam pipeline | 2.20 |
| Energy efficiency | | |
| | Energy Efficiency Act that covers promotion of energy efficiency in commercial, industrial, institutional and residential sectors | 2.89 |
| | Energy Ordinance (2008) | |
| Residential and commercial sectors | | |
| | Building design and standards for public buildings | NE |
| | Promotion of photovoltaic systems through feed-in tariff system | NE |
| ***Transport*** | National Transport Policy that includes measures to manage emissions from vehicles including an environment (fuel) levy on heavy-duty vehicles, adoption of European exhaust emission standards to limit $CO_2$ emissions from passenger vehicles and promotion of green transportation | NE |

| *Sectors affected* | *List of key policies and measures* | *Estimate of mitigation impact (kt $CO_2$ eq)* |
|---|---|---|
| | Integrated transport planning exploring increased usage of public transport and bicycles | NE |
| ***Agriculture*** | Agriculture Law and related measures to promote sustainable agriculture practices | NE |
| ***Forestry*** | Forestry Act and related measures to promote sustainable forest management | NE |
| ***Waste management*** | Environmental Protection Act | NE |
| | Technical Ordinance on Waste | NE |
| | Registration, evaluation, authorization and restriction of chemicals | NE |

*Note*: The estimates of greenhouse gas emissions avoided given for some measures are in annual carbon dioxide or carbon dioxide equivalent emissions for 2020, relative to a scenario in which those measures are not implemented.

*Abbreviation*: NE = not estimated.

## 3. Policies and measures in the energy sector

38. Between 1990 and 2011, GHG emissions from the energy sector decreased by 8.2 per cent (16.7 kt $CO_2$ eq), mainly owing to Liechtenstein's implemented measures linked to energy conservation, and to the 2008 global economic recession. The trend in GHG emissions from fuel combustion showed increases in transport (3.7 per cent or 2.8 kt $CO_2$ eq) owing to the increased motorization rate and the decrease in environmentally friendly passenger mobility. Energy use in the other sectors, mainly residential, institutional and commercial sectors, showed a decreasing trend in emissions (7.8 per cent or 7.11 kt $CO_2$ eq).

39. ***Energy supply***. Liechtenstein has no fossil fuel resources of its own with the supply of energy limited to firewood, ambient heat and electricity (hydroelectric power plants, photovoltaic systems, biogas and natural gas block-heating plants). In 2012, 10.7 per cent of the energy and 20.6 per cent of the electricity used in Liechtenstein was produced in the country. Total energy consumption in 2012 amounted to 1,360 GWh, with natural gas (22 per cent) and electricity (30 per cent) being the dominant shares of the total energy consumption. The share of renewable energy sources amounted to 5.0 per cent in 2012. In 2012, total energy consumption per capita reached 36.9 MWh. The majority of energy consumed in Liechtenstein in 2012 is being imported, with domestic electricity production amounting to approximately 86 GWh (hydroelectric plants, block-heating plants and photovoltaic systems).

40. ***Renewable energy sources***. The Ordinance on the Liberalization of the Electricity Market provides mechanisms to support the conveyance of renewable energies. Green electricity (LisStrom Oko), implemented in 2004, is an auditing and certification system of all domestic production sites according to the "naturemade" product mixture of renewable energy sources (hydropower plants) and new renewable energy sources (photovoltaic systems). In addition, a geological mapping initiative to identify geothermal potential aims for facilitation of the use of near-surface geothermal energy for heating purposes. The NC6 also provides information on policies related to financial support to renewable energies, such as the subsidies provided by the state of EUR 290/$m^2$ of solar collector installed and the contribution of EUR 540/installed output (kW) in photovoltaic systems.

41. ***Energy efficiency***. The Energy Ordinance of 2008 provided the key elements to achieve the commitment of energy saving. These elements are related to: target values for

the insulation of buildings; the establishment of the Energy Commission and the Bureau of Energy Consumption and Conservation; and financial support for energy conservation in buildings to advise municipalities and the private sector in energy conservation. In addition, the Energy Efficiency Act (adopted in 2008) aims for an overall reduction in the consumption of energy, by exploring intelligent and economical use of energy, as well as the promotion of renewable energies. Promotion of efficient energy systems such as heat insulation (renovation of old buildings), residential technical installations (room heating and non-potable water), solar energy (thermal solar collectors and photovoltaic systems) and demonstration facilities contributes to improved energy efficiency. The existing Energy Star Label system provides information to the consumer on the energy efficiency of office appliances. The Energy Star Label system has an impact on customer choice and allows for reduction of $CO_2$ emissions by preventing unnecessary standby of electric appliances and use of energy-intensive appliances.

42. ***Residential and commercial sectors***. Many of the energy policies in Liechtenstein are related to energy conservation, especially in the residential and commercial sectors. Available subsidies cover, for example, renovation of old buildings with subsidies of up to EUR 62,000 to be granted for heat insulation. If the building shell already fulfils the requirements for modern insulation, then residential technical installations with low energy consumption or operating with renewable energy can further enhance energy conservation, and may be supported with state subsidies up to EUR 17,000. In addition, almost all Liechtenstein municipalities provide additional funds to projects subsidized at the national level pursuant to the Energy Efficiency Act. The Minergie Standard employed for all new state buildings requires buildings to offer a high level of comfort, high economic efficiency and low energy consumption. Monitored ventilation systems also optimize air quality. In addition, heat insulation regulations set standards ensuring that installations and buildings are designed in an energy-efficient manner.

43. There are also regulations prohibiting the outdoor use of stationary resistance heating over 3 kW. The promotion of photovoltaic systems takes place through a feed-in tariff system. Photovoltaic systems generating electricity are subsidized with a contribution of EUR 540 per installed output (kW). The maximum subsidy per system is EUR 170,000. The generated electricity can be fed into the public network.

44. ***Transport sector***. The National Transport Policy includes a strategy for developing this sector. On the basis of this policy, the Liechtenstein Government has implemented or prepared several projects to promote public transportation with the objective of emission reduction, such as the expansion of Liechtenstein's Bus Authority. With regard to transportation of goods, Liechtenstein introduced a heavy-duty vehicle fee analogous to that in place in Switzerland which is designed to encourage a modal shift from road to rail in transport of goods. Liechtenstein importers are required to reduce the level of $CO_2$ emissions from cars registered for the first time in Liechtenstein to an average of 130 g $CO_2$/km by 2015. If the $CO_2$ emissions per kilometre exceed the target level, a penalty applies. Producers and importers of fossil fuels used in vehicles are required to use domestic measures to compensate for 10 per cent of the $CO_2$ emissions caused by the combustion of fossil fuels by 2020. The promotion of green vehicles through exemption of taxes is also reported in the NC6. No quantification of the effects of these particular PaMs has been reported.

45. In 2009, Liechtenstein, Austria and Austrian Railway signed a treaty to improve the railway infrastructure across Liechtenstein to establish a cross-border regional suburban train. In addition, the bicycle network is being expanded and made more attractive. Liechtenstein constructed and operates three public natural gas stations in order to support the use of natural gas vehicles. In addition, a biogas supply to complement the natural gas

infrastructure is available. Adoption of EU exhaust emission standards contributes to reduction of road traffic emissions.

46. Liechtenstein did not report specific measures to reduce emissions from international aviation and marine bunker fuels. The NC6 explained that the party only has a small heliport, and no international shipping activities occur in Liechtenstein. During the review, Liechtenstein provided some further information, which is described in section II.B.5 below.

47. ***Industrial sector***. The most important industries in Liechtenstein are mechanical engineering, electrical machinery, vehicle components, dental technology, food products and construction work. GHG emissions from the industrial sector decreased by 45.9 per cent between 1990 and 2011, which can be explained by the increasing trend in consumption of gaseous fuels and the decreased use of liquid fuels by these industries. The Emissions Trading Act sets obligations that apply to the two industrial combustion installations to participate in the EU ETS, and the $CO_2$ Act foresees a reduction in emissions from energy-related use of fossil fuels up to 2020, among others in the industrial sector.

### 4. Policies and measures in other sectors

48. Between 1990 and 2011, GHG emissions from the industrial processes (including solvent and other product use), agriculture and waste sectors increased considerably by 223 per cent (10.8 kt $CO_2$ eq), mainly owing to a sharp increase in the use of HFCs.

49. ***Industrial processes***. Between 1990 and 2011, GHG emissions from the industrial processes sector increased by 8.81 kt $CO_2$ eq, mainly owing to an increase in the use of HFCs. Liechtenstein did not report any specific PaMs addressing the reduction of GHG emissions from the industrial processes sector. The ERT encourages Liechtenstein to consider reporting on measures targeted to emissions from industrial processes in the next NC, if applicable.

50. ***Agriculture***. Between 1990 and 2011, GHG emissions from the agriculture sector increased by 1.8 per cent (0.41 kt $CO_2$ eq), mainly owing to the increase of livestock over the previous five years. The main PaMs in the agriculture sector are the Agricultural Law and the Water Protection Act. The Agricultural Law promotes environmentally friendly forms of production in order to maintain soil fertility. The Water Protection Act specifies the thresholds for animal husbandry per area unit. Regulations controlling the use of soil and number of cattle per land area assure prevention of the depletion of natural resources (soil). In addition, there are in place fiscal initiatives (product-independent contributions) to convert to ecological cultivation measures. In parallel with Switzerland, the ecological performance certificate was introduced for environmentally friendly cultivation and welfare-oriented animal husbandry. Currently, all registered farms operate according to these principles.

51. ***LULUCF***. The LULUCF sector was a net removal of 7.03 kt $CO_2$ eq in Liechtenstein in 2011 and net GHG removal increased by 25.7 per cent since 1990. The trend was mainly driven by the preservation of forest stocks and the promotion of forest management related to the preservation of nature. Forests, covering about 43 per cent of Liechtenstein's territory, play an important role in the country, and the issue of sustainability in forestry has been receiving attention since the nineteenth century. The Forestry Act of 1991 includes rules for the qualitative and quantitative preservation of forest stocks. In addition, international agreements on this matter provide the basis for forest management. Liechtenstein maintains forest reserves of 19 per cent of the forest area (1,300 ha), where all forms of forestry activities are prohibited, as well as special forest areas of about 560 ha (8 per cent) to preserve old and traditional forms of forest

management. In June 2001, Liechtenstein published a national forest programme that encompassed international obligations to promote sustainable forest management.

52. ***Waste management***. Between 1990 and 2011, GHG emissions from the waste sector increased by 13.2 per cent (0.2 kt $CO_2$ eq), which were probably driven by the population growth in Liechtenstein.

53. The basis for waste legislation is the Environmental Protection Act, which requires the separate disposal of different types of waste. Landfilling of combustible waste is prohibited under the Technical Ordinance on Waste. All waste is incinerated in a plant in Switzerland, and the energy produced in this process is reused. Liechtenstein also applies EU regulations concerning registration, evaluation, authorization and restriction of chemicals, which address the production and use of chemical substances, and their potential impacts on both human health and the environment.

## 5. Policies and measures related to implementation of commitments under the Kyoto Protocol

54. Liechtenstein reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol.

55. The NC6 does not include information required by the UNFCCC reporting guidelines on NCs on how Liechtenstein promotes and implements the International Civil Aviation Organization (ICAO) and International Maritime Organization (IMO) decisions to limit emissions from aviation and marine bunker fuels, nor on how Liechtenstein addresses PaMs implemented and/or further elaborated, as well as cooperation with other such Parties in achieving its quantified emission limitation. Nevertheless, Liechtenstein explains in the NC6 that no international shipping activities occur in the country and emissions from aviation are of minor importance (emissions are related to only one small heliport and constitute 0.3 per cent of the total GHG emissions), therefore implying that Liechtenstein does not promote or implement ICAO and IMO decisions. To increase the transparency and completeness of its reporting, the ERT recommends that Liechtenstein report in its next NC explicit and specific information pertaining to this reporting requirement and that based on national circumstances to be clearly justified, it does not promote and implement ICAO and IMO decisions to limit emissions from aviation and marine bunker fuels.

56. In its NC6, Liechtenstein reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts, on other Parties, especially developing country Parties. Further information on Liechtenstein's reporting on this requirement is presented in chapter III.B below.

57. The NC6 underlines in a sentence of the PaMs chapter how Liechtenstein seeks to implement and minimize the adverse effects on climate change on other countries and mentions that the set of measures included in the Energy Strategy 2020 addresses the need to minimize adverse effects of its proposed measures by checking compatibility with economic and social requirements. However, it is not clear what those economic and social requirements are, or how they minimizing adverse effects of climate changes or of international trade. To improve the transparency of its reporting, the ERT recommends that Liechtenstein provide further information on economic and social requirements with which its PaMs need to be compatible and how these requirements contribute to minimize climate change effects and adverse effects of PaMs on international trade and social, environmental and economic impacts on other Parties in its future NCs.

## C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

58. In its NC6, Liechtenstein has provided information on its projections for GHG emissions, including $CO_2$, $CH_4$, $N_2O$, perfluorocarbons (PFCs), HFCs and sulphur hexafluoride ($SF_6$). New projections of emissions and removals of GHGs were produced for the NC6 compared with the NC5. The projections are based on the policy instruments that were implemented and adopted in 2008–2011 and new planned measures for the period 2012–2020. The projections reference scenario builds on a series of assumptions, all of which are subject to uncertainty.

### 1. Projections overview, methodology and key assumptions

59. The GHG emission projections provided by Liechtenstein in the NC6 include a 'with measures', a 'with additional measures' and a 'without measures' scenario for 2015, 2020, 2025 and 2030, presented relative to actual inventory data for 1990, 1995, 2000, 2005, 2010 and 2011. Projections are presented on a sectoral basis, using the same sectoral categories as used in the PaMs section of the NC6 and on a gas-by-gas basis for the following GHGs: $CO_2$, $CH_4$, $N_2O$, PFCs, HFCs and $SF_6$. Projections are also provided in an aggregated format for each sector, as well as for a national total, using global warming potential values from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and were not included in the totals.

60. Liechtenstein does not have a comprehensive emission projection model at its disposal due to the small size of its economy, related activities and limited capacity to develop a modelling framework, particularly for non-energy sectors. However compared with the NC5, the methodology has been significantly improved. The projections presented for 2015, 2020, 2025 and 2030 rely on the latest emission and energy use data available for Liechtenstein and on the energy scenarios provided by Liechtenstein's Energy Strategy 2020 and emissions avoided resulting from PaMs implemented in the country. In addition, comparisons and analogies with the projections and assumptions developed for Switzerland are used by Liechtenstein in deriving its own emission projections for emissions from other sectors.

61. The starting point for Liechtenstein's projections in the NC6 is the Energy Strategy 2020, adopted by the government in 2012, which describes three different energy scenarios until 2020. Two of these scenarios have been used in order to define Liechtenstein's emissions scenarios: 'with measures' and 'with additional measures'. A baseline scenario 'without measures' was already defined in Liechtenstein's NC5. Projections of gas-specific emissions are based on a master projection (total GHG emissions in $CO_2$ eq) from which the projections of the individual GHGs such as $CO_2$, $CH_4$, $N_2O$ and the F-gases are calculated using individual scaling factors according to the shares given in Liechtenstein's GHG inventory 2011. The 'with measures' scenario is based on measures set out in the legal framework presented in the PaMs section of this report, namely the Environmental Protection Act, the Emissions Trading Act, the $CO_2$ Act, the Energy Efficiency Act and the Forestry Act, and on environmental levies and waste diversion measures.

62. Liechtenstein reported on the changes to the methodology compared to the NC5; some of these were further elaborated during the review, including the provision of supporting documentation. The changes to the methodology resulted especially in the application of Liechtenstein's Energy Strategy 2020 for all energy-related categories instead of applying rules of proportion to (scaling down) Switzerland's projections in order to reflect assumptions and parameters specific to Liechtenstein's national circumstances.

The approach of the NC6 for energy-related projections can therefore be considered to be an important improvement element where respective factors from within the Energy Strategy 2020 are delineated for each fuel type, with the fuel type factors being a weighted quantity based on absolute consumption data. Extrapolations are used to generate projections in other sectors with the exception of F-gases, which are a proportion of Switzerland's F-gas emissions.

63. The ERT noted the key assumptions included in the NC6. They describe recent population and gross domestic product (GDP) trends and energy price developments, and are consistent with those included in the NC5.

64. The sensitivity of the results analysed using different input parameters is not discussed in the NC6. The main modelling parameters and assumptions are presented in the NC6 and were provided by the Party during the review; these include growth trends for population and employment. However, the impact of variation in these parameters on the projected GHG emissions was not discussed in the NC6, and no results with regard to uncertainty ranges were provided. Other indicators such as GDP or world oil prices were not considered within Liechtenstein's NC6 projections. The ERT encourages Liechtenstein to include in its next NC more information on key modelling parameters and to include the results of its sensitivity and uncertainty analyses.

### 2. Results of projections

65. Liechtenstein's target under the Kyoto Protocol is, on average, 211.12 kt $CO_2$ eq per annum during the first commitment period of the Kyoto Protocol, from 2008 to 2012, which represents an 8 per cent emission reduction target compared with the base year level. According to the GHG inventory data provided in the NC6, which are based on the 2013 annual submission, Liechtenstein's average annual emissions during 2008–2011 amounted to 242.08 kt $CO_2$ eq. Moreover, according to the 2014 annual submission data, which have not been reviewed yet, Liechtenstein's preliminary average annual emissions during 2008–2012 amounted to 235.11 kt $CO_2$ eq. This means that Liechtenstein's Kyoto Protocol target in the first commitment period will not be achieved by domestic action alone.

66. In 2007, the Liechtenstein Government decided to make use of the Kyoto Protocol mechanisms and to acquire credits amounting to 230 kt $CO_2$ eq within the period 2008–2012, mainly through the clean development mechanism (CDM). During the review week, Liechtenstein provided the ERT with information about its intention to use the amount of 200,000 certified emission reductions, which it has already bought for compliance within the period 2008–2012.

67. In its NC6, Liechtenstein reported a description of its quantified economy-wide emission reduction target under the Convention. In respect to total GHG emissions, the target is to achieve a reduction of 20 per cent below the 1990 level by 2020, with the option to increase its ambitions to 30 per cent, if other developed countries commit themselves to comparable emission reduction efforts and if economically more advanced developing countries take appropriate mitigation actions.

68. With respect to the second commitment period, from 2013 to 2020, of the Kyoto Protocol, Liechtenstein's quantified economy-wide emission reduction target is a reduction of 20 per cent in total GHG emissions compared to the base year level (1990), which corresponds to the allowed level of GHG emissions of 184.26 kt $CO_2$ eq in 2020. According to the projections presented in the NC6, under the 'with measures' scenario, the country's GHG emissions will amount to 193.99 kt $CO_2$ eq in 2020, which means a gap in achieving its Kyoto Protocol target of 9.72 kt $CO_2$ eq in 2020. The priority of Liechtenstein remains to achieve its second commitment period target by implementing domestic measures. The legal framework ensuring the focus on domestic measures was transferred

into the new Emissions Trading Act in September 2012. Regarding the assumed 2020 gap, Liechtenstein envisaged taking the option of continuing to use credits from the Kyoto Protocol mechanisms from projects with high-quality standards.

69. Based on the projection results provided in the NC6, the projected reduction in GHG emissions under the 'with measures' and 'with additional measures' scenarios, in 2020 in relation to 1990, are 15.8 and 30.1 per cent, respectively. The projected emission reductions under the 'with measures' and 'with additional measures' scenarios by 2030 are 23.2 and 38.9 per cent, respectively, compared to the 1990 levels. The contribution of different gases to Liechtenstein's total emission projections are as follows: for the 'with measures' scenario, total GHG emissions of 193.98 kt $CO_2$ eq in 2020, including $CO_2$, $CH_4$ and $N_2O$ emissions of 158.23, 14.53 and 12.73 kt $CO_2$ eq, respectively. The total GHG emissions are expected to be 176.79 kt $CO_2$ eq in 2030, including $CO_2$, $CH_4$ and $N_2O$ emissions of 142.52, 14.51 and 12.84 kt $CO_2$ eq, respectively. This represents a decrease in $CO_2$, $CH_4$ and $N_2O$ emissions of 18.1, 5.6 and 2.3 per cent, respectively, by 2020 compared with the 2011 levels. The projected emissions of F-gases are negligible. The drivers underlying the projected decrease in emissions are: improvements in energy efficiency in industry, commerce and households; renewable energy (photovoltaics); transport measures including exhaust emission standards for passenger cars and increased public transport; and greater waste diversion.

70. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and quantified economy-wide emission reduction target are presented in table 5 and the figure.

Table 5
**Summary of greenhouse gas emission projections for Liechtenstein**

| | *Greenhouse gas emissions (kt $CO_2$ eq per year)* | *Changes in relation to the base year[a] level (%)* | *Changes in relation to the 1990 level (%)* |
|---|---|---|---|
| Kyoto Protocol base year | 229.48 | NA | –0.4 |
| Kyoto Protocol target for the first commitment period (2008–2012) | 211.12 | –8.0 | –8.3 |
| Kyoto Protocol target for the second commitment period (2013–2020) | 192.76 | –16 | NA |
| Quantified economy-wide emission reduction target under the Convention[c] | 184.26 | –20, –30 | –20, –30 |
| Inventory data 1990[d] | 230.33 | 0.4 | NA |
| Inventory data 2011[d] | 222.04 | –3.2 | –3.6 |
| Average annual emissions for 2008–2011[d] | 242.08 | 5.5 | 5.1 |
| 'Without measures' projections for 2020[e] | 262.0 | 14.2 | 13.7 |
| 'With measures' projections for 2020[e] | 194.0 | –15.5 | –15.8 |
| 'With additional measures' projections for 2020[e] | 161.0 | –29.8 | –30.1 |

| | *Greenhouse gas emissions (kt $CO_2$ eq per year)* | *Changes in relation to the base year[a] level (%)* | *Changes in relation to the 1990 level (%)* |
|---|---|---|---|
| 'Without measures' projections for 2030 | 262.0 | 14.2 | 13.7 |
| 'With measures' projections for 2030 | 176.8 | –23.0 | –23.3 |
| 'With additional measures' projections for 2030 | 140.8 | –38.6 | –38.9 |

[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target."

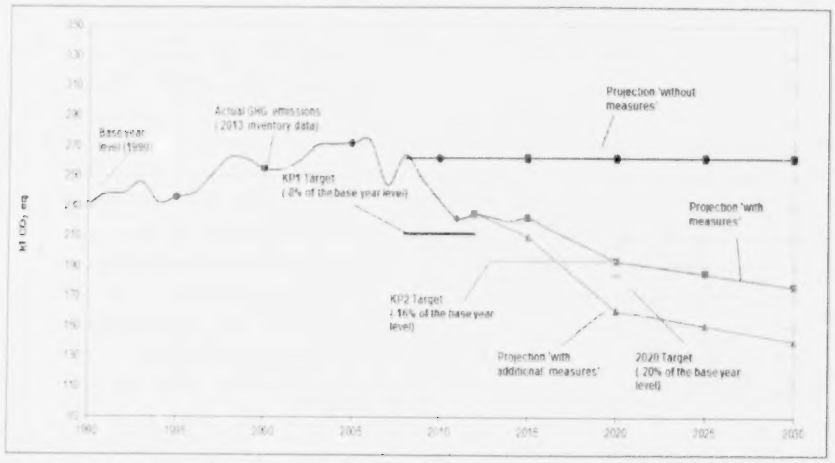
[b] The Kyoto Protocol base year level of emissions is provided in the initial review report contained in document FCCC/IRR/2007/LIE.

[c] Liechtenstein's unconditional target under the Convention is 20 per cent, whereas its conditional target is a 30 per cent reduction in total greenhouse gas emissions.

[d] Liechtenstein's 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry.

[e] Liechtenstein's sixth national communication and/or first biennial report.

**Greenhouse gas emission projections**




*Sources*: (1) Data for the years 1990–2011: Liechtenstein's 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry. (2) Data for the years 2011–2030: Liechtenstein's sixth national communication and/or first biennial report; the emissions are without land use, land-use change and forestry.

*Abbreviations*: GHG = greenhouse gas, KP1 = Kyoto Protocol first commitment period, KP2 = Kyoto Protocol second commitment period.

## 3. Total effect of policies and measures

71. In the NC6, Liechtenstein presents the estimated and expected total effect of implemented and adopted PaMs for the energy sector, and an estimate of the total effect of its PaMs, in accordance with the 'with measures' definition, compared with a situation without such PaMs. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a $CO_2$ eq basis), in 1995 and 2000. It also presents relevant information on factors and activities for each sector for the years 1990, 1995, 2000, 2005, 2010, 2011, 2015, 2020, 2025 and 2030.

72. The NC6 includes information on the estimated and expected emission levels for 2020 and 2030 by sector and by gas for the 'with measures' and 'with additional measures' scenarios. However, the 'without measures' scenario for 2020 and 2030 is included only for total GHG emissions. Liechtenstein did not provide an explicit estimate of the total effect of all planned, implemented and adopted PaMs; nevertheless, this total effect might be calculated from the abovementioned NC6 information, particularly from tables 5-11 and 5-12 of the NC6. The ERT recommends that Liechtenstein improve the transparency of its reporting by explicitly reporting the calculated total effect of its adopted and implemented PaMs.

73. Liechtenstein reported that the total estimated effects of adopted and implemented PaMs are 68.01 kt $CO_2$ eq and 85.20 kt $CO_2$ eq in 2020 and 2030, respectively. The most effective PaMs and drivers leading to avoided GHG emission are described in chapter II.B above. Table 6 provides an overview of the total effect of PaMs as reported by Liechtenstein.

Table 6
**Projected effects of planned, implemented and adopted policies and measures in 2020 and 2030**

| *Sector* | *Effect of implemented and adopted measures (kt $CO_2$ eq)* | *Relative value (% of 1990 emissions)* | *Effect of planned measures (kt $CO_2$ eq)* | *Relative value (% of 1990 emissions)* | *Effect of implemented and adopted measures (kt $CO_2$ eq)* | *Relative value (% of 1990 emissions)* | *Effect of planned measures (kt $CO_2$ eq)* | *Relative value (% of 1990 emissions)* |
|---|---|---|---|---|---|---|---|---|
| | *2020* | | | | *2030* | | | |
| Energy (without transport) | NE | NE | 33.11 | 14.4 | NE | NE | 32.32 | 14.0 |
| Transport | NE | NE | 4.29 | 1.9 | NE | NE | 2.89 | 1.3 |
| Industrial processes | NE | NE | 4.74 | 2.1 | NE | NE | 4.74 | 2.1 |
| Agriculture | NE | NE | 0.00 | 0.0 | NE | NE | 2.92 | 1.3 |
| Land-use change and forestry | NE | NE | 0.00 | 0.0 | NE | NE | 0.00 | 0.0 |
| Waste management | NE | NE | 0.00 | 0.0 | NE | NE | 0.00 | 0.0 |
| **Total** | **68.01** | **29.6** | **42.14** | **4.3** | **85.2** | **37.0** | **42.87** | **15.6** |

*Source*: Liechtenstein's sixth national communication.

*Note*: The total effect of implemented and adopted policies and measures is defined as the difference between the 'without measures' and 'with measures' scenarios; the total effect of planned policies and measures is defined as the difference between the 'with measures' and 'with additional measures' scenarios.

*Abbreviation*: NE = not estimated.

### 4. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

74. Liechtenstein in its NC6 provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. The Parliament adopted a regulation in the new Emissions Trading Act (2012), which stipulates that the main focus of reduction measures in Liechtenstein shall be domestic action. Only when the reduction potential of all domestic actions is exhausted can Liechtenstein consider the purchase of carbon credits through the Kyoto Protocol mechanisms.

75. Liechtenstein's target under the Kyoto Protocol is, on average, 211.12 kt $CO_2$ eq per annum during the first commitment period of the Kyoto Protocol, from 2008 to 2012, which represents an 8 per cent emission reduction target compared with the base year level of 229.48 kt $CO_2$ eq. According to the GHG inventory data provided in the NC6, which are based on the 2013 annual submission, Liechtenstein's average annual emissions during 2008–2011 amounted to 242.08 kt $CO_2$ eq. Moreover, according to the 2014 annual submission data, which have not been reviewed yet, Liechtenstein's preliminary average annual emissions during 2008–2012 amount to 235.11 kt $CO_2$ eq. This means that there is an annual average gap of 30.96 kt $CO_2$ eq and 23.99 kt $CO_2$ eq based on average annual emissions based on data from the annual review report of the 2013 submission and the 2014 GHG inventory submission, respectively. Therefore, Liechtenstein's Kyoto Protocol target in the first commitment period will not be achieved by domestic action alone.

76. According to the NC6, domestic action constitutes a significant element of the efforts made by Liechtenstein to meet its Kyoto Protocol target. However, there is insufficient information provided in the NC6 on the contribution of domestic action in terms of avoided GHG emissions for the ERT to conclude whether the use of the Kyoto Protocol mechanisms is supplemental to domestic action. In 2007, the government decided to make use of the Kyoto Protocol mechanisms and to acquire about 230 kt $CO_2$ eq through the CDM during the first commitment period of the Kyoto Protocol, from 2008 to 2012. This total amount over the five-year period implies an annual amount of 46 kt $CO_2$ eq, which is enough to close the gap.

77. The ERT therefore recommends that Liechtenstein improve the transparency of its reporting by providing more explicit information on how domestic action represents a significant element of the efforts made by Liechtenstein to meet its Kyoto Protocol target in its next NC.

## D. Provision of financial resources and technology transfer to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

### 1. Financial resources, including "new and additional" resources and resources under Article 11 of the Kyoto Protocol

78. Liechtenstein is not a Party included in Annex II to the Convention and is therefore not obliged to adopt measures and fulfil obligations as defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, in its NC6, Liechtenstein provided information on provision of support required under the Convention and its Kyoto Protocol.

79. In its NC6, Liechtenstein provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention as required by the UNFCCC reporting guidelines on NCs and under Article 11 of the Kyoto Protocol, as required by the "Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol". Liechtenstein has, however, not indicated what "new and additional" financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention and clarified how it has determined such resources as being "new and additional".

80. Liechtenstein has reported detailed information on the assistance it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to these adverse effects. Furthermore, Liechtenstein has provided information on other financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels. In particular, it provided financial resources related to the implementation of the Convention through bilateral, regional and other multilateral

channels, the Convention on Biological Diversity and the United Nations Environment Programme (environmental fund and the multilateral fund under the Montreal Protocol on substances that deplete the ozone layer).

81. In addition, Liechtenstein has provided information on its financial contribution to the Adaptation Fund, established in accordance with decision 10/CP.7. With regard to the most recent financial contributions of fast-start funding to enhance the implementation of the Convention by developing countries, Liechtenstein has committed itself to provide USD 625,000 for the years 2013–2015. Table 7 summarizes information on financial resources and technology transfer. The ERT took note of the fact that the reported financial resources are in local currency (Swiss francs) and not in United States dollars.

82. During the review, Liechtenstein provided additional information, elaborating on how the financial resources are to assist developing countries and the mechanisms that have been put in place to ensure the monitoring, reporting and verification of funds dedicated for financial resources, transfer of technology and capacity-building. Liechtenstein provided also additional information elaborating on how official development cooperation is regulated. According to the Party, the IHCD Law provides for the principles of IHCD and for the various categories, in which development projects can be funded. Projects related to the environment, sustainability and climate change can be funded within the framework of multilateral development cooperation.

83. The ERT notes that Liechtenstein could explore how financial resources can be reported in United States dollars to enable comparability, and that a distinction is made with regard to where the resources are being allocated (i.e. mitigation of GHG emissions or adaptation to the adverse effects of climate change).

Table 7
**Summary of information on financial resources and technology transfer for 2009–2012**
(Swiss francs)

| *Allocation channel of public financial support* | *Years of disbursement* | | | |
|---|---|---|---|---|
| | *2009* | *2010* | *2011* | *2012* |
| Official development assistance | | | | 26 781 303 |
| Contributions through multilateral channels, including | 307 586 | 318 851 | 205 636 | 285 381 |
| European Bank for Reconstruction and Development | 0 | 8 667 | 0 | 0 |
| United Nations Development Programme | 240 000 | 250 000 | 150 000 | 235 292 |
| United Nations Environment Program | 33 589 | 34 855 | 31 545 | 25 580 |
| UNFCCC (Kyoto Adaptation Fund) | 11 857 | 3 354 | 2 145 | 2 633 |
| United Nations Convention to Combat Desertification | 6 221 | 6 147 | 5 955 | 5 780 |
| International Union for the Conservation of Nature | 15 652 | 15 828 | 15 991 | 16 096 |

## 2. Technology transfer, including information under Article 10 of the Kyoto Protocol

84. Liechtenstein has provided in its NC6 partially comprehensive and well-organized information on activities related to the transfer of technology and notable activities by the

public sector. A detailed review of reported information is provided in chapter II.D.3 of the report of the technical review of the first biennial report.

85. The ERT notes that providing information on the transfer of technology in distinct categories clearly showing which activities are to be undertaken by the public sector and which by the private sector would greatly improve the transparency of the next NC. The ERT also notes that Liechtenstein may want to explore how information on what institutional, legal and procedural arrangements exist for quantifying Liechtenstein's capacity-building support and for reporting and archiving this information can be included in future NCs.

86. During the review, Liechtenstein provided additional information elaborating on what countries are the focus of its delivery of capacity-building and technology transfer. Liechtenstein may wish to provide this information in future NCs.

87. During the review, Liechtenstein provided the ERT with information on activities related to technology transfer, including success and failure stories, and its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies in its NC. Furthermore, Liechtenstein provided information during the review on steps taken to promote, facilitate and finance the transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries. Liechtenstein clearly tabulated its Water and Energy Saving Project that is based in the United Republic of Tanzania and provided detailed information on this project.

## E. Vulnerability assessment, climate change impacts and adaptation measures

88. In its NC6, Liechtenstein has provided the required information on the expected impacts of climate change in the country and on adaptation options. However, the ERT noted that Liechtenstein did not include information on adaptation measures to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation, especially concerning the formulation and implementation of measures to facilitate adequate adaptation to climate change and concerning cooperation with developing countries in their adaptation efforts. The ERT recommends that Liechtenstein include this information in its next NC to improve the transparency of its submission.

89. During the review, Liechtenstein provided additional information elaborating on the progress made in preparing a national adaptation strategy since the NC5. The Adaptation Strategy, to be finalized in the course of 2014, proposes a series of adaptation measures and actions to be taken in different sectors, such as agriculture, forestry, biodiversity, tourism, water resources and health. The ERT encourages Liechtenstein to provide an outline of the actions taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation in its next NC. Table 8 summarizes the information on vulnerability and adaptation to climate change presented in the NC6.

Table 8
**Summary of information on vulnerability and adaptation to climate change**

| *Vulnerable area* | *Examples, comments, adaptation measures reported* |
|---|---|
| Agriculture and food security | *Vulnerability*: Changes in temperature and precipitation patterns are expected to cause a shift to suitable areas for agricultural production, including longer vegetation periods (positive impact) and increasing incidence of pests (negative impact) with the climate stabilization scenario (water requirements are expected to be met by river water |

| *Vulnerable area* | *Examples comments adaptation measures reported* |
|---|---|
| | supply). If summer temperature increases even more than 4 °C (by 2060) as per non-intervention scenarios, the impacts will be unfavourable: risk of water scarcity, higher costs for irrigation and risk of stress for dairy production |
| | *Adaptation*: A national adaptation strategy that covers all the sectors is under preparation |
| Biodiversity and natural ecosystems | *Vulnerability*: Impacts already evident that will be enhanced by climate changes: move of species towards higher elevation, spread of new species and phenological shifts |
| | *Adaptation*: Information not reported |
| Natural hazards | *Vulnerability*: Increased number of natural hazards (flooding, avalanches and landslides) |
| | *Adaptation*: Preparation and updating of the 'geological risk map' |
| Drought | *Vulnerability*: Frequency, duration and intensity of summer warm spells and heatwaves will increase. Changes in warm spell duration index will account for 10–80 days by 2100 |
| | *Adaptation*: Information not reported |
| Forests | *Vulnerability*: Substantial shift in forest composition, more drought-tolerant trees favoured |
| | *Adaptation*: Conversion of spruce and fir stocks into mixed deciduous and coniferous forests |
| Human health | *Vulnerability*: Expected increased mortality due to heatwaves, indirect consequences from storms, floods and landslides |
| | *Adaptation*: Information not reported |
| Energy | *Vulnerability*: Decreased energy demand for heating and increased demand for cooling |
| | *Adaptation*: Information not reported |
| Water resources | *Vulnerability*: Long-term annual run-off and groundwater level are expected to change slightly, and to deteriorate during summer droughts. Increased weather instabilities may lead to floods and droughts |
| | *Adaptation*: Information not reported |
| Tourism | *Vulnerability*: Will affect winter tourism due to a rise of the freezing level |
| | *Adaptation*: Strategies to promote 'gentle tourism' |

90. In its NC6, Liechtenstein provided information on observed and expected changes in temperature and precipitation patterns, frequency and intensity of extreme events. The vulnerability and adaptation analysis is focused on impacts on the cryosphere, the hydrological cycle and water resources, water quality, biodiversity, forests and forestry, agriculture and health.

91. Projections indicate an increase, compared to the reference period 1980–2009, in the seasonal mean temperature of 3.2–4.8 °C and 2.7–4.1 °C by 2100 for the non-intervention scenarios A2 and A1B, respectively. An annual increase of 1.2–1.8 °C is projected by the stabilization scenario. Precipitation in winter is likely to increase, while in summer, a decrease of 8–10 per cent is predicted as per the stabilization scenario, and an even greater decrease is projected by non-intervention scenarios. The ERT notes that progress has been made in the NC6 in impact analysis, compared with the NC5.The NC6 reports Liechtenstein's participation in the C3-Alps project and the close cooperation with Switzerland in the area of climate change and adaptation.

## F. Research and systematic observation

92. Liechtenstein has provided information on its actions relating to research and systematic observation, and addressed domestic and international activities, including the Global Climate Observing System. However, the ERT noted that due to Liechtenstein's small size and limited resources, its engagement in international activities is very limited.

93. The NC6 does not include information required by the UNFCCC reporting guidelines on NCs on its actions relating to research and systematic observation addressing international activities, including the World Climate Programme, the International Geosphere–Biosphere Programme and the IPCC. The ERT recommends that Liechtenstein include this information in its next NC.

94. During the review, Liechtenstein provided additional information elaborating on action taken to support capacity-building related to climate change and adaptation in developing countries in Asia and Africa. As part of the global effort, Liechtenstein, with the help of public–private partnerships (PPPs), has committed to fast-start finance of up to USD 58 per capita in grant funding from May 2010 to May 2013.

95. Liechtenstein supports research activities with its neighbouring states and with international bodies, and advocates the cross-border coordination of land-use planning. Liechtenstein has reported on its participation in the Interreg III B programme Alpine Space and EU research programmes, as well as on its annual contributions to the Swiss National Science Foundation and the Austrian Science Fund.

96. In addition, Liechtenstein has provided information about the main research activities undertaken by the University of Liechtenstein (Institute for Architecture and Planning and Institute for Financial Services). In its NC6, Liechtenstein has provided information on the collection of a wide range of data relating to climate from its own measuring stations and stations run by private companies, and through interregional cooperation, especially with Switzerland. Liechtenstein has also provided information about the common monitoring procedure of air quality with eastern Swiss cantons.

## G. Education, training and public awareness

97. In the NC6, Liechtenstein has provided information on its actions relating to education, training and public awareness at the domestic level. Information on education in schools, public outreach and cooperation with public and non-governmental organizations has been reported. During the review, Liechtenstein provided additional information elaborating on action taken to support capacity-building related to climate change and adaptation in developing countries in Asia and Africa. As part of the global effort, Liechtenstein, with the help of PPPs, has committed to fast-start finance of up to USD 58 per capita in grant funding from May 2010 to May 2013.

98. The Ministry of Education is responsible for the coordination of education in the country. The Education Act and the Vocational Education and Training Act are relevant legislative provisions. Environmental education, as a part of the official curriculum, including various projects and activities, plays an important role in the educational programme. As also reported in the NC5, financial support with regard to environmental and climate change education is continuously provided by the Liechtenstein Government to several projects, such as LIFE Climate Foundation Liechtenstein (since 2012), implementation of a personal carbon footprint programme within the framework of a social architecture and a competition on sustainable housing and renovation (2010). Many non-governmental institutions, such as the Liechtenstein Environmental Protection Society, the Solar Society, etc., are also engaged in public information and education activities.

# III. Summary of reviewed supplementary information under the Kyoto Protocol

## A. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

99. Supplementary information provided by Liechtenstein under Article 7, paragraph 2, of the Kyoto Protocol in its NC6 is mostly complete and mostly transparent. The supplementary information is located in different sections of the NC6. Table 9 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol, as well as references to the NC6 chapters in which this information is provided.

100. Liechtenstein has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: identification of steps taken to promote and/or implement any decisions by ICAO and IMO in order to limit or reduce GHG emissions not included in the Montreal Protocol from aviation and marine bunker fuels, and a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and sustainable use of natural resources. The ERT noted that, except for a small helicopter airport, there are no aviation activities in Liechtenstein, and that Liechtenstein is land bound with no rivers or lakes, which collectively limit possibilities to fulfil the requirements with regard to ICAO and IMO decisions to limit emissions from aviation and marine bunker fuels. The technical assessment of the information reported under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 9
**Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol**

| *Supplementary information* | *Reference to the sixth national communication* |
|---|---|
| National registry | Section 3.5 |
| National system | Section 3.4 |
| Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 | Section 5.3 |
| Policies and measures in accordance with Article 2 | Section 4.3 |
| Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures | Section 4.2 |
| Information under Article 10 | Section 7.3 |
| Financial resources | Sections 7.1 and 7.2 |

## B. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

101. Liechtenstein reported the information requested in section II, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", of the annex to decision 15/CMP.1 as a part of its 2013 annual submission. It has not reported, however, how it gives priority to the actions taken to implement its commitments under Article 3, paragraph

14, of the Kyoto Protocol. During the review, Liechtenstein provided the ERT with the additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. Therefore, based on the above, the ERT considers the reported information to be partially complete. The ERT commends Liechtenstein for the additional information provided. The ERT noted that Liechtenstein could continue exploring and reporting on the adverse impacts of the response measures. It recommends that Liechtenstein include in its next annual submission information on any changes that have occurred compared with the information reported in its last submission.

102. The 2013 and previous NIRs and the additional information provided during the review presented several initiatives of Liechtenstein aimed at minimizing adverse impacts, including cooperating in the development of technologies, assisting developing Parties that are highly dependent on the export of fossil fuels in diversifying their economies and conducting relevant research.

## IV. Conclusions and recommendations

103. The ERT conducted a technical review of the information reported in the NC6 of Liechtenstein according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 provides a good overview of the national climate policy of Liechtenstein. The information provided in the NC6 includes most mandatory information required by the UNFCCC reporting guidelines on NCs with the exception of information on: PaMs in accordance with Article 2 of the Kyoto Protocol; domestic and regional programmes and/or legislative arrangements and administrative procedures; and elements of the supplementary information under Article 7 of the Kyoto Protocol. During the review, Liechtenstein provided additional information on PaMs, projections and how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing countries.

104. Liechtenstein's emissions for 2011 were estimated to be 2.7 per cent below its 1990 level excluding LULUCF and 3.6 per cent below including LULUCF. Emission decreases were mostly underpinned by GHG emission trends in the energy sector, which were driven by fuel consumption, especially in the transport, residential, commercial and institutional subsectors.

105. In the NC6, Liechtenstein presents GHG projections for the period from 2015 to 2030. Three scenarios are included: baseline ('without measures') scenario; 'with measures'; and 'with additional measures'. The projected reductions in GHG emissions under the baseline scenario, in relation to the base year levels, and under the 'with measures' and 'with additional measures' scenarios, are –13.7, 15.8 and 30.1 per cent, respectively. The projections indicate that Liechtenstein can meet its Kyoto Protocol target for the second commitment period (20 per cent reduction), only under the 'with additional measures' scenario, under which projected GHG emissions are not expected to exceed the Kyoto Protocol target even by 2020. Based on a comparison of the target and the average annual emissions for 2008–2011, Liechtenstein is in a position to meet its Kyoto Protocol target (8 per cent reduction) for the first commitment period (2008–2012) with the use of Kyoto Protocol flexible mechanisms only.

106. The NC6 contains information on how Liechtenstein plans to use the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol, although Liechtenstein did not elaborate

on supplementarity as such. Liechtenstein is planning to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target.

107. The NC6 provided detailed and well-organized information on PaMs adopted and planned by Liechtenstein in order to meets its commitments. The main climate-related policy is the Climate Protection Strategy, which coordinates different sector measures. Two other important policies are the $CO_2$ Act and the Emissions Trading Act, which are strongly linked with Swiss policies, as cross-border cooperation with Switzerland plays an important role in Liechtenstein's PaMs. Because of the size of the country, PaMs that reduce GHG emissions are mostly linked with energy conservation, energy efficiency and use of renewable energy.

108. Although Liechtenstein is not a Party included in Annex II to the Convention, the NC6 contains some information on financial resources and technology transfer. Liechtenstein is commended for including this information in its NC and is encouraged to explore how to enhance its reporting in this regard.

109. Liechtenstein has provided information on vulnerability and climate change impact in different sectors. Information provided related to actions taken to implement Article 4, paragraph 1(b) and (e), of the Convention regarding adaptation is limited because the Adaptation Strategy, currently under preparation, is due for completion by the end of 2014.

110. Liechtenstein has taken actions to support capacity-building related to climate change and adaptation in developing countries in Asia and Africa through the fast-start finance programme with the help of PPPs. Liechtenstein also supports research activities with its neighbouring states and with international bodies, and advocates the cross-border coordination of land-use planning.

111. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol is provided by Liechtenstein in its 2013 annual submission.

112. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of Liechtenstein's reporting under the Convention and its Kyoto Protocol. The recommendations[7] are that Liechtenstein:

(a) Improve completeness of reporting by including in the next NC the following information:

(i) PaMs required under the Kyoto Protocol, especially with regard to procedures for addressing cases of non-compliance under domestic law for the domestic and regional programmes;

(ii) How Liechtenstein believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals, consistent with the objective of the Convention;

(iii) Actions relating to research and systematic observation addressing international activities;

(b) Improve the transparency of reporting by including in the next NC the following information:

(i) How arrangements and administrative procedures ensure implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol contribute to the conservation of biodiversity and the sustainable use of resources;

[7] The recommendations are given in full in the relevant sections of this report.

(ii) National circumstances regarding aviation and navigation activities in Liechtenstein, and how this relates to the decisions of ICAO and IMO to limit emissions from aviation and marine bunker fuels;

(iii) Each reported PaM, namely on its implementation status and the implementing entities involved;

(iv) The priority given to the actions taken to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol regarding the minimization of adverse impacts of response measures to climate change;

(v) How domestic action represents a significant element of the efforts made by Liechtenstein to meet its Kyoto Protocol target;

(vi) Specific calculated total effect of adopted and implemented PaMs.

## V. Questions of implementation

113. During the review, the ERT assessed the NC6, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol and reviewed information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, with regard to timeliness, completeness, transparency and adherence to the reporting guidelines on NCs. No question of implementation was raised by the ERT during the review.

# Annex

## Documents and information used during the review

### A. Reference documents

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 23/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=20>.

FCCC/SBI/2011/INF.1. Compilation and synthesis of fifth national communications. Executive summary. Note by the secretariat. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01.pdf>.

FCCC/SBI/2011/INF.1/Add.1. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Policies, measures, and past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01a01.pdf>.

FCCC/SBI/2011/INF.1/Add.2. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Financial resources, technology transfer, vulnerability, adaptation and other issues relating to the implementation of the Convention by Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01a02.pdf>.

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FCCC/ARR/2013/LIE. Report of the individual review of the annual submission of Liechtenstein submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/lie.pdf>.

FCCC/IRR/2007/LIE. Report of the review of the initial report of Liechtenstein. Available at <http://unfccc.int/resource/docs/2007/irr/lie.pdf>.

FCCC/IDR.5/LIE. Report of the in-depth review of the fifth national communication of Liechtenstein. Available at <http://unfccc.int/resource/docs/2011/idr/lie05.pdf>.

Sixth national communication of Liechtenstein. Available at <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc6_br1_lie[1].pdf>.

2013 GHG inventory submission of Liechtenstein. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php>.

2014 GHG inventory submission of Liechtenstein. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php>.

## B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Sven Braden (Office of Environment), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Liechtenstein.